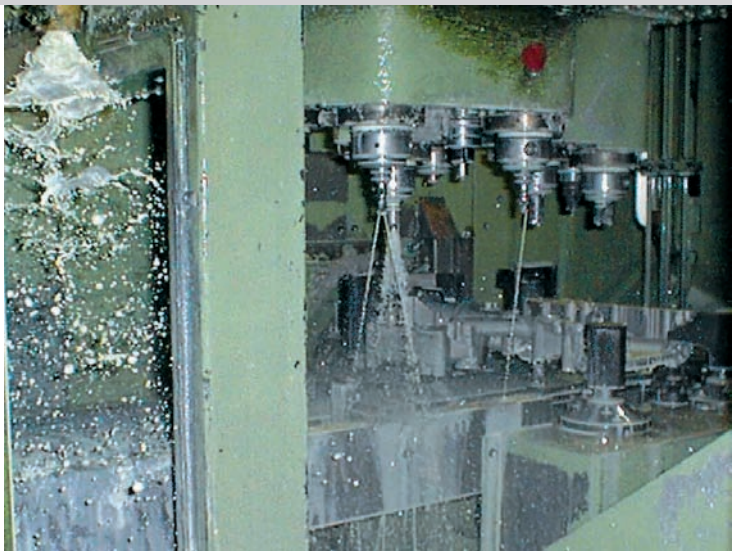
SKALAR

Quality Control of Lubricants



In the metal shaping industry lubricant emulsions are used to ease the labor on the piece of work. This is achieved by the emulsion's double function of cooling and lubrication.

The lubricants are divided into two categories:

- non water miscible products
- water miscible products

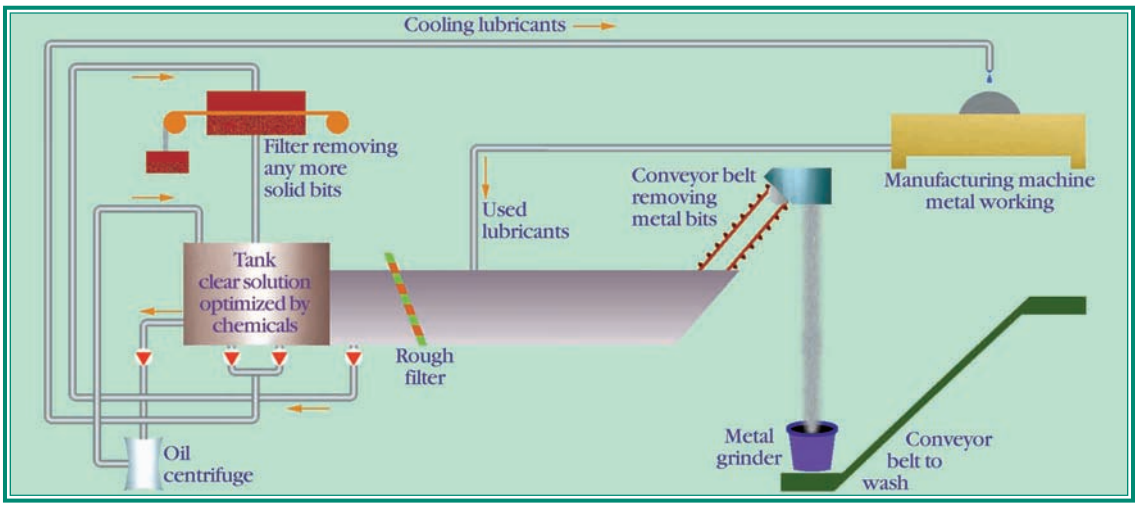
The water miscible products particularly have to be examined regularly to control the quality of the emulsion determining its performance of cooling and lubrication. The quality of the emulsion also influences the labor process with labor sanitation, health and safety, shelf life of the lubricant and other such costs.

For quality control of the emulsion the following parameters are usually measured:

* **Biozid concentration**
* **Chloride**
* **Conductivity**
* **pH**
* **Nitrite**

At the Daimler - Benz AG plant in Untertürkheim, Stuttgart, engines, axles and gears are manufactured. During this production a variety of different water miscible lubricants are used and analyzed on a regular basis. An important control criterion is the determination of the concentration of the biozid, which is determined by analyzing the parameter Formaldehyde. The standard manual determination of formaldehyde is a very complex and time consuming water distillation procedure whereby about 20 minutes preparation time are required per sample. The weekly number of samples at Daimler - Benz AG amounts to 100, which thus required automation as soon as possible. The Skalar San^{++} Continuous Flow Analyzer provides this automation.

The big advantage of automation in comparison to the classical manual method is the elimination of sample pre-treatment, also the sample volume required is a factor of 3 times less. Specifically for lubricant analysis the random access autosampler can be equipped with a stirring device for homogenizing the sample during uptake.



Lubricant flow in the manufacturing plant

The Skalar San^{++} Continuous Flow Analyzer

Large range of samplers available

After fine-tuning the Skalar San^{++} Continuous Flow Analyzer was enabled to run over-night and fully automatically unattended for all installed parameters. At the end of the overnight analysis run the analyzer automatically shuts itself down after completing a rinsing cycle. Results are then available at the appropriate time early in the morning, before production starts. It is then possible to directly correct the concentrations of the essential parameters. An outcome of this was that the reliability of the production process increased significantly.

It should be made clear that parallel to the analysis of the formaldehyde, other important parameters e.g. nitrite, chloride, etc., are also analyzed.

The Skalar San^{++} Continuous Flow Analyzer has been installed at the Daimler – Benz AG for product quality control and lubricant optimization in the production process. Calibration and concentration correction factors for an optimal lubricant condition were setup in house. These factors fully rationalize the optimum integration effect.

In conclusion the integration of the Skalar San^{++} Continuous Flow Analyzer has decreased the laboratory labor required for the installed parameters to a factor of 10% of the labor required for the manual methods. The return on investment was calculated at approximately fifteen months on this labor alone. Cost savings on the reduction of reagents used for testing and also in production aspects such as the increment shelf life of the lubricant and less down time during the metal shaping process are also apparent.

Applications for the quality control of lubricants include:

* **Aluminium**
* **Boron**
* **Calcium**
* **Chloride**
* **Conductivity**
* **Cyanide**
* **DOC/TOC**
* **Formaldehyde**
* **Iron**
* **Magnesium**
* **Nitrate**
* **Nitrite**
* **pH**
* **Potassium**
* **Sodium**
* **Total Hardness**
* **Zinc**

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